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MICHIGAN WATER RESOURCES COMMISSION
BUREAU OF WATER MANAGEMENT
MICHIGAN DEPARTMENT OF NATURAL RESOURCES

Industrial Wastewater Survey Report

TRW, Inc.
Michigan Division
Portland Division
City of Portland
Ionia County

US EPA RECORDS CENTER REGION 5



487764

January 19, 20, 21, 1971

Purpose of Survey

On Tuesday, January 19, 1971, members of the Michigan Water Resources Commission staff began conducting the first of two consecutive 24-hour industrial wastewater surveys at TRW, Inc., Portland, Michigan. The purpose of these surveys was to determine the quantity and quality of wastewater being discharged by this company into the Grand River.

Plant Processes, Sources of Wastewater and Treatment

TRW, Inc., Portland Division, manufactures and assembles steering components for heavy road equipment such as graders and trucks. The majority of the parts produced by this entity are supplied as unfinished forgings by other firms. These forgings are then machined and assembled by TRW and shipped out. Other parts not produced elsewhere are formed at TRW on up-setters, then machined and assembled.

The sources of wastewater from the forming, machining and assembly operations are cooling waters from the heat-treating, cutting oil and water soluble oil from the machining, and oily waste from seven parts washers. Other sources of wastewater from the manufacturing operation originate from a bonderizing line, paint room, air compressors, boiler blowdown and the air conditioning system.

TRW, Inc. utilizes a series of three ponds into which all wastewater is discharged. The first pond is used to trap the floating oils which can be skimmed off during warm weather months and trucked away. The second and third ponds act as safeguards by trapping any floating oils which may escape from the first pond. The final discharge of the third pond is into a swampy area adjacent to the ponds and connected to the Grand River. These ponds are located approximately 300 feet east of the plant and on the extreme west edge of the flood plain of the Grand River (fig. 1).

In addition to the above mentioned industrial wastewaters, the sanitary sewage of the 300 employees is treated by a septic tank and then discharged into the first of the three ponds. The sanitary sewage does not receive any chlorination.

A majority of the parking lots, service areas and roof drains are also connected to these ponds and have in the past discharged more water to the ponds than the ponds had the capacity to hold, causing these ponds to spill their contents onto the flood plain.

Survey Procedure and Results

A 90-degree vee-notch weir was installed at the discharge pipe of the final pond to provide an access site for an automatic wastewater sampler and a water level recorder. The sampler was used to obtain proportional samples of the instantaneous flow over the weir at 15-minute intervals. These samples were deposited into a clean container which made up a composite sample representative of the wastewater flow over a 24-hour period. The recorder was used to continuously measure the elevation of the wastewater flowing over the weir providing a time-head curve from which the total flow during the 24-hour period could be computed.

The above procedures were carried out for two consecutive 24-hour periods. At the end of each 24-hour survey, the composite sample was transported to the Bureau of Water Management Laboratory in Lansing for selected chemical and physical analysis. Bacteriological samples collected during the survey were transported also to the Michigan Department of Public Health Laboratory for coliform density analysis.

Table 1 Wastewater flows in million gallons daily (MGD) from the final outlet of the collection ponds as computed from the time-head curves supplied by the recorder.

<u>Survey Period</u>	<u>Time Started</u>	<u>Time Ended</u>	<u>Actual Flow Discharged</u>	<u>Flow in MGD</u>
Jan. 19-20, 1971	4:00 pm	3:45 pm	61,244 —	0.062
Jan. 20-21, 1971	4:00 pm	3:50 pm	59,371 —	0.062

Table 2 Physical and chemical analyses of the composite wastewater samples collected from the pond overflow and the computed pounds per day of selected constituents present in the overflow during each survey period.

<u>Parameter</u>	<u>Concentrations*</u>		<u>Pounds per day**</u>	
	<u>1st Survey</u> <u>mg/l.</u>	<u>2nd Survey</u> <u>mg/l</u>	<u>1st Survey</u> <u>lbs/day</u>	<u>2nd Survey</u> <u>lbs/day</u>
5-day biochemical oxygen demand	11	6	5.7	3.1
Chemical oxygen demand	115	144	50	75
Suspended solids	28	23	15	12
Suspended volatile solids	28	20	15	10
Total phosphorous - P	3.8	3.7	2.0	1.9
Soluble orthophosphates - P	2.9	3.3	1.5	1.7
Organic nitrogen - N	1.3	1.0	0.7	0.5
Ammonia nitrogen - N	1.5	1.5	0.8	0.8
Nitrate nitrogen - N	0.00	0.00	0	0
Oil	18	24	9.3	12.4
Chloroform extractables	21	28	11	15
Nickel, Ni	0.0	0.0	0	0
pH	8.3	8.2		

* All concentrations are expressed as milligrams per liter (mg/l) except pH.

** Pounds per day are computed from the following formula: lbs/day = conc. (mg/l) x flow (MGD) x unit weight of water (8.34 lbs/gal).

Table 3 Bacteriological analyses of the grab samples collected from the final effluent of the collection ponds and samples collected from the septic tank discharge to the ponds.

<u>Parameter</u>	<u>First Survey</u>		<u>Second Survey</u>	
	<u>Influent*</u>	<u>Effluent**</u>	<u>Influent*</u>	<u>Effluent**</u>
Total coliforms density, cts/100 ml	390,000	370,000	470,000	250,000
Fecal coliform density, cts/100 ml	170,000	65,000	78,000	70,000

* Influent sample was collected from a 24-inch vitrified clay pipe which contained the septic tank effluent as well as some of the industrial wastewater.

** Effluent sample was collected at the 90-degree vee-votch weir.

Survey Remarks

Because of the snow and ice conditions at the time of this survey, it could not be determined where the flow from the pond actually reached the Grand River after passing through the swamp. Observations indicated that this point lies somewhere to the north of these ponds.

The sediments below the outfall of the final pond consisted mainly of oil sludge and sand. Oil could be seen on the aquatic plants which were not ice or snow covered.

The volume of oil discharged to the swampy area amounted to 1.3 gal. during the first survey and 1.7 gal. during the second.

Survey by: Thomas A. Newell, Sanitary Engineer

Contact with management: Kieth Patterson, Plant Engineer
Lyle Hynes, Plant Maintenance Superintendent

Chemical and physical analyses by: R. Krueger, Chemist

Bacteriological analyses by: Michigan Department of Public Health

Report by: Thomas A. Newell
Water Quality Appraisal Section
Water Resources Commission
Bureau of Water Management
Michigan Department of Natural Resources

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FIGURE 1: VICINITY MAP OF TRW, INC. AND SURROUNDING AREA OF PORTLAND.

